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A Comparison of Preferences of Targeted Therapy for Metastatic Renal Cell Carcinoma between the Patient Group and Health Care Professional Group in South Korea

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ABSTRACT

Objectives: To evaluate the preferences of health care professional groups and patient groups with respect to efficacy, adverse events, and administration method for targeted agents of metastatic renal cell carcinoma. **Methods:** A total of 485 respondents including cancer patients and health care professionals (medical oncologists, nurses, and pharmacists) were surveyed by using a discrete choice experiment in South Korea. Through a literature review and expert consultation, six attributes—progression-free survival, four adverse events (bone marrow suppression, hand-foot skin reaction, gastrointestinal perforation, and bleeding), and administration—were selected. This study employed the conditional logit regression model. **Results:** The six attributes are statistically significant for the patient group and health care professional group. The two groups, however, present differences in progression-free survival, hand-foot skin reaction, gastrointestinal perforation, and administration. The relative importance of adverse events is greater for the patient group, while that of efficacy and administration is greater for the health professional group. For doctors, the relative importance of efficacy is as high as 31%, compared with 7% for the patient group. If progression-free survival is prolonged by 1 month, the acceptable level of bone marrow suppression is 1.3% for the patient group and 9.6% for doctors and that of hand-foot skin reaction is 1.0% and 11.8%, respectively, for the patient group and doctors. **Conclusions:** This study demonstrates substantial differences in the preference for a targeted drug between the patient group and the health care professional group. Doctors prefer effective and orally administered drugs while patients show more reluctant attitudes about adverse events than do health care professionals.

Keywords: discrete choice experiment, preference, relative importance, renal cell carcinoma, trade-off.

Introduction

Metastatic renal cell carcinoma (mRCC) is resistant to frequently used cytotoxic chemotherapy or radiotherapy [1], and the efficacy of immune therapy for mRCC has also been limited [2]. Therefore, patients suffering from mRCC did not have many choices regarding treatment prior to the development of targeted therapy. As a result of recent studies on the molecular mechanism of renal cell carcinoma, targeted agents for suppressing the angiogenesis of tumor cells have been developed [3] and proven to prolong the progression-free survival (PFS) and the overall survival (OS) of the patient.

There are several targeted agents in the treatment for mRCC, but they differ from each other in terms of efficacy, adverse event profiles, and administration [4]. For instance, sunitinib is different from bevacizumab even though they are both targeted agents that can be regarded as primary standard treatments for mRCC. Sunitinib is more efficacious and is an orally administered drug but has numerous more adverse events while bevacizumab has fewer adverse events but is less effective and is an intravenously administered drug [4–6].

Generally, preference for a drug depends on not only the efficacy of the drug but also various other attributes such as adverse events and the administration method. It can thus be anticipated that the preferences of not only health care professionals but also patients would have an impact on the successful treatment of disease. In the treatment of relatively severe diseases such as cancer, patients usually passively follow the treatment suggested and determined by the medical staff because of information asymmetry relating to their diseases and drugs [7,8]. If, however, the efficacy does not satisfy their expectations or if adverse events that are unexpected or serious or reduce quality of life occur, their compliance and, consequently, the treatment outcome would be negatively affected [9,10]. Good communication between a physician and a patient can lead to the patient's active participation in the treatment decision, which is related to improved outcomes [11–13]. The preferences of medical staff and patients and the gaps between these two groups should hence be carefully examined.

The discrete choice experiment (DCE) evaluates a product's value by considering several of its representative attributes. In the field of health care research, the DCE is used in examining the

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preferences for drugs or treatments as well as the willingness to pay [14–19]. This study, through a DCE survey, aimed to elicit the preferences of medical staff and patients/patients' family members for recently developed targeted agents used in mRCC and to identify the significantly important factors influencing drug preference.

Methods

DCE methodology

A DCE assumes that the utility of a certain product is determined by several product attributes and their levels [20,21]. In a DCE, hypothetical scenario sets with differing levels of attributes are presented to respondents; each respondent combines the information and chooses the most preferable among the alternatives. The value of the product is estimated from the combination of attributes and levels selected [22]. The attributes should have significant impacts on drug selection; the levels should be realistically achievable to the extent that the respondents can carefully consider them in the selection [20].

The relative importance of each attribute for preferences and the trade-offs between attributes can be estimated from the results chosen by respondents by considering different attribute levels [15,16,18].

Attributes and attribute levels

Attributes and their levels were identified by a literature review on sunitinib and bevacizumab and were then finalized after expert consultation [23–26]. In addition to these drugs, there are several other targeted agents used for mRCC that have various adverse events. Because of the DCE methodology, however, we focused on these two representative drugs, which are the most common targeted agents as primary standard treatments for mRCC, and chose a limited number of attributes. On the basis of a comprehensive literature review and expert opinions, we selected two major and typical adverse events for each drug that are extremely severe or have a significant impact on the quality of life for patients and hence should be carefully considered in drug use.

As an efficacy attribute, PFS was selected. For ethical reasons in clinical trials, additional treatment is usually permitted after progression of disease and thus OS cannot be seen as a pure efficacy attribute of the drug while PFS appears to be more specific to an individual drug. Selected as adverse events were hand-foot skin reaction (HFSR), bone marrow suppression (BMS), gastrointestinal (GI) perforation, and bleeding. PFS and the four adverse events were defined according to three levels by extension to a hypothetical range based on clinical literature. Sunitinib is orally administered once a day. Bevacizumab is intravenously injected at the hospital once every 2 weeks but must be administered with interferon-α for mRCC, and thus three-times-per-week subcutaneous self-injection at home was included in the category of administration method (Table 1).

	Drug A	Drug B
Progression-free survival	10 months	11 months
Bone marrow suppression (neutropenia/thrombocytopenia)	1%	9%
Hand-foot skin reaction	0%	5%
Gastrointestinal perforation	1%	2%
Bleeding	4%	0%
Administration	Orally once a day (at home)	Intravenous injection once every 2 weeks (at hospital) and subcutaneous injection three times a week (at home)
Which would you choose between Drug A and Drug B?		

Fig. 1 – Example of choice set.

DCE scenario

The levels of six attributes were 3, 3, 3, 3, 3, and 2, and therefore 486 hypothetical profiles were available (i.e., 35*2). We selected similar structures for the attributes and levels as presented in our study "A Library of Orthogonal Arrays" (N.J.A.Sloan, http://www2.research.att.com/~njas/oadir/) to form 18 arrays and generated scenario sets by the fold-over method. In this case, two treatments always have different levels within the scenario set; the generated scenario sets meet orthogonality and minimum overlapping and achieve equal balance where the same number of levels should be included (Fig. 1).

Asking the patients and patients' family members to answer all the 18 choice sets may disturb rational judgment, and consequently they were randomly divided to create two versions. A total of 10 questions were asked, with one dominant choice set added to the last part of the questionnaire for an irrationality check. A pilot test was carried out with 20 persons to check for any problems. After examining terminology and other factors, the final questionnaires were completed. Prior to answering DCE questions, respondents were asked to rank four adverse events used in the survey to identify their perception on severity.

In the DCE questionnaire, the drug name was not stated to avoid any possible selection bias and hence respondents chose their preference between drug A and drug B in the hypothetical scenario set. In the survey questionnaire, brief explanations of the terminologies used in the questionnaire were provided with simple terms to aid in the respondents' understanding.

Data collection

The survey was carried out separately for the patient group and the health care professional group. The former group included cancer patients and their family members, while the latter group included doctors (medical oncologists), nurses (oncology nurses and general nurses), and pharmacists in South Korea. The survey

Table 1 – Attributes and levels for targeted drugs.

Attributes of first-line therapy	Levels			Coefficients in regression analysis
Progression-free survival: PFS (mo)	10	11	13	β_1
Bone marrow suppression: BMS (%)	1	9	18	β_2
Hand-foot skin reaction: HFSR (%)	0	5	10	β_3
Gastrointestinal (GI) perforation (%)	0	1	2	β_4
Bleeding (%)	0	2	4	β_5
Administration (0 = oral, 1 = injection)	0	1		β_6

Table 2 – Characteristics of respondents.

Characteristics	% (persons)	
	Total respondents	Analysis included
Patient group		
Composition		
Cancer patient	70 (140)	69.8 (120)
Patients' family member	30 (60)	30.2 (52)
Sex		
Male	36.5 (73)	34.3 (59)
Female	63.5 (127)	65.7 (113)
Age (y)		
Cancer patient	57.3	57.2
Patients' family member	47.1	47.1
Health care professional group		
Doctor (medical oncologist)	13.7 (39)	14.3 (39)
Oncology nurse	11.9 (34)	12.1 (33)
General nurse	46.7 (133)	44.9 (122)
Pharmacist	27.7 (79)	28.7 (78)

on the patient group was undertaken by well-trained interviewers through face-to-face interviews. They briefly described the contents of the survey and if respondents had any questions, they answered in detail as presented in the questionnaire. For the health care professional group, the questionnaires filled out by nurses and pharmacists working in seven major hospitals in Seoul were collected. Medical oncologists were individually contacted, and questionnaires were sent out and returned via e-mail.

The survey was conducted between September and October 2010; 200 persons in the patient group (i.e., 140 cancer patients and 60 patients' family members) and 285 persons in the health care professional group (i.e., 39 medical oncologists, 34 oncology nurses, 133 general nurses, and 79 pharmacists) completed the survey (response rate for medical oncologists: 61.9% [39 of 63], nurses: 98.2% [167 of 170], and pharmacists: 84.9% [79 of 93]). Data from 444 of the total of 485 respondents—except 41 irrational respondents (20 patients, 8 patients' family members, 1 oncology nurse, 11 general nurses, and 1 pharmacist)—were analyzed, including 172 persons in the patient group, 39 doctors, 33 oncology nurses, 122 general nurses, and 78 pharmacists (Table 2). Irrational respondents were defined as those who chose an inferior scenario in the irrationality check questionnaire.

Analyses

This study employed the conditional logit regression model to analyze the impacts of attribute and level on drug preference by using STATA version 10.1.

Coefficients derived from the conditional logit model can be expressed as the following equation:

$$V = \beta_1\text{PFS} + \beta_2\text{BMS} + \beta_3\text{HFSR} + \beta_4\text{GI perforation} + \beta_5\text{Bleeding} + \beta_6\text{Administration}$$

where V is the utility derived for targeted therapy and β_1 to β_6 are the coefficients of each attribute.

The coefficients and their confidence intervals of each attribute are specified in Table 3. If the coefficient estimated from the conditional logit regression model is statistically significant, its attribute holds significance in drug preference, with the sign of the coefficient representing either a positive effect or a negative effect on drug choice and the magnitude of the coefficient representing the relative importance [20]. As each attribute has a different range of levels, the coefficient is multiplied by the difference of the

Table 3 – Coefficients and odds ratios of patient group and health care professional group.

Choice	Patient group (n = 172)		Health care professional group (n = 272)		Patient group vs. health care professional group
	Coefficient	Odds ratios	Coefficient	Odds ratios	
Progression-free survival	0.1153* (0.058–0.173)	1.122* (1.060–1.188)	0.3123* (0.262–0.362)	1.367* (1.300–1.437)	*
Bone marrow suppression	−0.0866* (−0.098 to −0.075)	0.917* (0.906–0.928)	−0.0999* (−0.111 to −0.089)	0.905* (0.895–0.915)	
Hand-foot skin reaction	−0.1118* (−0.130 to −0.094)	0.894* (0.878–0.910)	−0.0663* (−0.081 to −0.052)	0.936* (0.922–0.950)	*
Gastrointestinal perforation	−0.3176* (−0.405 to −0.230)	0.728* (0.667–0.795)	−0.1438* (−0.215 to −0.073)	0.866* (0.807–0.930)	†
Bleeding	−0.1539* (−0.200 to −0.108)	0.857* (0.819–0.897)	−0.1765* (−0.214 to −0.139)	0.838* (0.808–0.870)	
Administration	−0.5996* (−0.734 to −0.465)	0.549* (0.480–0.628)	−1.0854* (−1.207 to −0.964)	0.338* (0.299–0.382)	*

Note. Values in parentheses are confidence intervals.

* $P < 0.001$.

† $P < 0.05$.

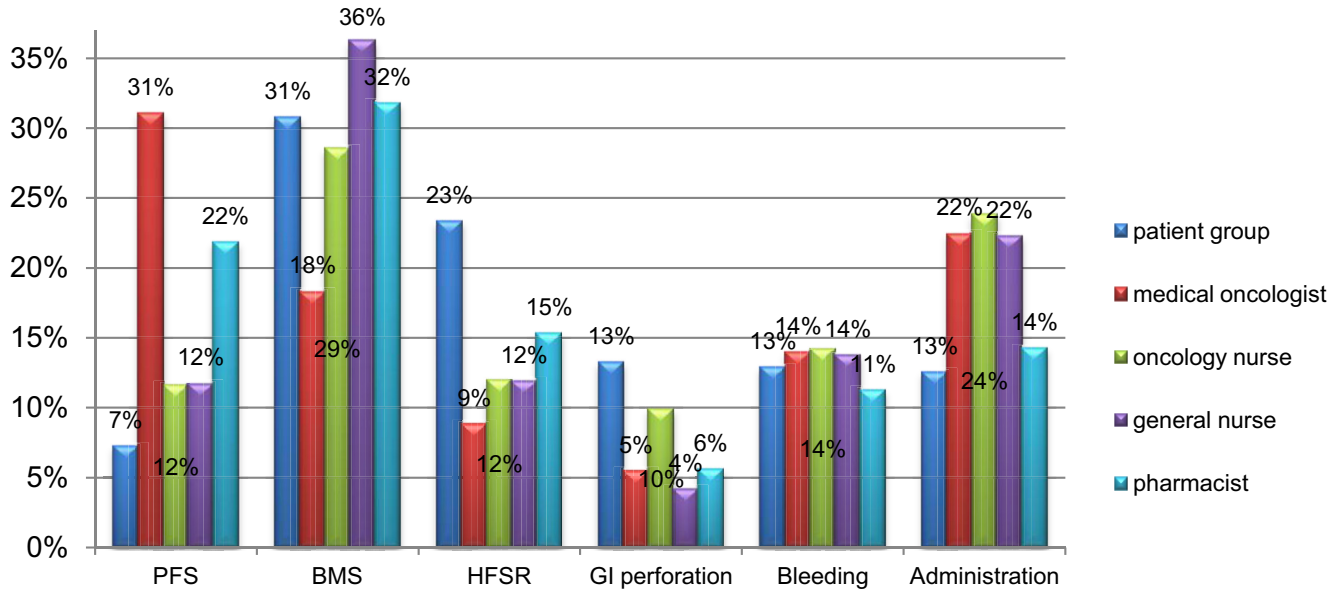

Fig. 2 – Relative importance of attributes by group. BMS, bone marrow suppression; GI, gastrointestinal; HFSR, hand-foot skin reaction; PFS, progression-free survival.

levels to ensure the sum amounts to 100%; the ratio of each attribute, meaning the relative importance, was then calculated to derive the attribute's relative contribution to preference (Fig. 2) [15].

The odds ratios (ORs) for the attribute demonstrate the effect on the likelihood of expressing preference for a treatment in case of the probability of experiencing the attribute increasing by one unit.

Expressed as the ratio of coefficients between two attributes, the marginal rate of substitution refers to the extent of willingness to trade-off one attribute for another [14]. We divided the coefficient of PFS by each coefficient of other attributes to determine the acceptability of adverse events if the PFS were extended by 1 month. Subgroup analyses were carried out to compare the differences in preferences between the patient group and the health care professional groups by using the Chow test, which can be used to explore whether the coefficients estimated over one group of data are equal to the coefficients estimated over another.

Results

DCE results

The coefficients of each attribute were statistically significant in both the patient group and the health care professional group, indicating that all six attributes are important for drug preference (Table 3). While the sign of the coefficient for PFS was positive, that for adverse events and administration was negative. Therefore, the preferences increased with greater drug efficacy and decreased when adverse events occurred more frequently or the administration method was switched from oral to injection. In the patient group, when the PFS was prolonged by 1 month and the other attributes remained unchanged, preference increased by 12.2% (OR 1.122) compared with 36.7% (OR 1.367) for the health care professional group (Table 3). When the administration method was switched from oral to injection, preferences were lowered by 45.1% (OR 0.549) for the patient group and by 66.2% (OR 0.338) for the health care professional group. The coefficients for PFS, HFSR, and GI perforation and administration differed significantly between the patient group and the health care professional group.

Subgroup analyses

The coefficients also showed the same pattern in subgroup analyses (Table 4). The coefficients of the patients and patients' family members were not statistically different and therefore we did not separate them into two groups. The patient group and doctors demonstrated significant differences in PFS, HFSR, and administration. Significant differences were found in the coefficients of other attributes besides PFS and bleeding between the patient group and nurses. Significant differences were also found in PFS and BMS between the patient group and pharmacists. Differences were even found within the health care professional groups, with doctors and nurses differing on PFS and BMS and doctors and pharmacists showing differences on BMS and administration.

In the comparison of ranking the adverse events, where respondents were asked to rank events by order of severity, doctors and nurses replied that GI perforation was the most serious adverse event while the patient group and pharmacists thought that BMS was the most serious (Table 5).

Relative importance

The relative contribution of each attribute to preference is displayed in Figure 2. The relative contribution of PFS was 31% for doctors, while it was 7% for the patient group, 22% for pharmacists, and 12% for nurses, showing considerable gaps across subgroups. The second most important attribute for doctors was the administration method, while adverse events contributed less to preference. Nurses, pharmacists, and the patient group replied that the relative importance of BMS was the greatest.

Marginal rate of substitution between attributes

If the PFS were prolonged by 1 month, doctors would be willing to accept 9.6% of BMS and 11.8% of HFSR. The values were 3.9% and 4.8%, respectively, for pharmacists, while the numbers were slightly smaller for nurses. For the patient group, the acceptable percentages of these two adverse events were 1.3% and 1.0%, respectively (Table 6).

Table 4 – Coefficients of subgroups.

Choice	Patients group			Doctors (n = 39)	Nurses			Pharmacists (n = 78)	Patient group vs. doctors	Patient group vs. oncology nurses	Patient group vs. general nurses	Patient group vs. pharmacists	Doctors vs. oncology nurses	Doctors vs. general nurses	Doctors vs. pharmacists
	Patient group total (n = 172)	Patients (n = 120)	Patients' family members (n = 52)		Nurses total (n = 155)	Oncology nurses (n = 33)	General nurses (n = 122)								
Progression-free survival	0.1153*	0.1259*	0.0927	0.5972*	0.2093*	0.2422†	0.2015*	0.4333*	*			*	†	*	
Bone marrow suppression	−0.0866*	−0.0871*	−0.0861*	−0.0621*	−0.1085*	−0.1052*	−0.1100*	−0.1113*			†	†		†	†
Hand-foot skin reaction	−0.1118*	−0.1150*	−0.1056*	−0.0508†	−0.0632*	−0.0751†	−0.0613*	−0.0911*	†		†				
Gastrointestinal perforation	−0.3176*	−0.2990*	−0.3610*	−0.1571	−0.1472†	−0.3099†	−0.1075†	−0.1665†			†				
Bleeding	−0.1539*	−0.1644*	−0.1324†	−0.2013*	−0.1864*	−0.2220*	−0.1774*	−0.1675*							†
Administration	−0.5996*	−0.6666*	−0.4540*	−1.2952*	−1.2142*	−1.4947*	−1.1505*	−0.8472*	*	*	*				

* $P < 0.001$.
† $P < 0.05$.

Discussion

This study shows that preferences in relation to efficacy, adverse events, and administration method for targeted agents of mRCC were significantly different between the patient group and the health care professional group. Both groups took into account not only efficacy but also adverse events and the administration method in considering preferences, but their relative contribution to preference varied substantially by groups.

The health care professional group placed relatively greater value on efficacy and oral administration in comparison with the patient group. Patients considered adverse events to be more important regarding their preference, and consequently favored drugs with less adverse events, regardless of the types and severity of adverse events. Similar to the findings of our study, patients with a cardiovascular condition showed more averse attitudes to drug treatment than did health professionals and they were more distressed about side effects [27].

To recognize the trade-offs between two attributes, the marginal rate of substitution was identified. While the patients were willing to trade-off 1-month prolongation of PFS with low levels of all adverse events, doctors who placed the greatest value on efficacy were willing to accept more adverse events than patients. Doctors' preferences increased more compared with other groups in the event that the efficacy could be improved or if the administration method were changed from injection to oral administration.

There are many factors involved in explaining the difference in the preferences between the patient group and the health care professional group such as drug taker's perspective, health belief, and sociocultural background [28]. One of the causes of the difference in the preferences shown in this study may be the disparity of the expectations for treatment and adverse events. It appears that the patient group possesses relatively less information on diseases and drugs compared with health care professionals and they might not fully understand the medical information given [29] such as various adverse events and their severity. If a drug's efficacy does not turn out to be as great as expected or if patients experience severe or frequently occurring adverse events unexpectedly, they might not continue their treatment [9] and consequently the treatment outcome would be affected negatively [10]. Doctors frequently are not aware of patients' misunderstanding regarding treatment and treatment outcome [30].

On the contrary, the health care professional group, especially medical oncologists, possesses detailed information and abundant clinical experience on diseases and therapies; however, they do not adequately know the patients' preference [31]. They might not be sufficiently aware of patient suffering caused by adverse events and the impact of drugs on patients' quality of life. Under such circumstances, they would choose drugs whose efficacy is improved, even slightly, despite adverse events, if there are no alternative treatments; they would also choose drugs if the adverse events could be prevented or controlled easily, even if they are more severe or frequent.

Doctors and nurses considered the administration method importantly in preference and, interestingly, they preferred orally administered drugs, whereas the patient group showed lower preference. It appears that the patients were accustomed to visiting the hospital regularly in line with schedules for treatment and, to some extent, might look forward to seeing their doctors more often in the case of severe diseases. Fallowfield et al. [32] reported that 63% of the patients with advanced breast cancer preferred orally administered drugs but about one fourth of the patients preferred monthly injection because of convenience and adherence. The patients' preference for administration changed if they possessed information of the efficacy or adverse events of the drug [32].

Table 5 – Proportion of responses evaluating each adverse event as the most severe.

Adverse events (%)	Patient group (n = 172)	Doctors (n = 39)	Oncology nurses (n = 33)	General nurses (n = 122)	Pharmacists (n = 78)
Bone marrow suppression	41	10	18	38	59
Hand-foot skin reaction	19	0	0	4	5
Gastrointestinal perforation	22	77	58	39	32
Bleeding	18	13	24	19	4
Total	100	100	100	100	100

A previous study [33] reported that patients worried about a higher rate of adverse events more than severity, and experience of adverse events did not markedly influence their judgment. In other studies [34,35], doctors and patients represented different preferences and trade-offs for efficacy and adverse events. We also observed in this study that a higher rate of adverse events might have a negative impact on the patients' preference. Previous studies comparing preferences between patients and physicians for preventive osteoporosis drug treatment have also shown that preferences differ between patients and physicians. General practitioners placed higher relative values on the effectiveness of preventive osteoporosis drug treatment and shorter treatment duration, respectively, than did patients [19]. We also identified a gap in preferences between experts and patients and furthermore among health care professional groups.

The patients' opinion is growing more important in treatment decisions [36], with the growing trend of patient-centered decision making [37], and most cancer patients would like to be involved in the decision-making process [31,38]. There is a wide disagreement, however, between physicians and patients [39], and it was reported that half of the patients took a passive decision-making role [40]. Cancer patients continue to have unmet communication needs associated with treatment-related information [41]. A previous study found that communication between doctors and patients and providing more information to patients would be helpful in decision making [34] and giving access to accurate, balanced, evidence-based, and comprehensive information about health care options contributed in improving patients' adherence to treatment [42]. That is, ensuring that patients have a better understanding of their situation and giving information to patients through good communication would help in decision making and eventually improve the treatment outcome [43–45]. Therefore, efforts such as effective communication with easily understandable information about the risks and expected outcomes and operation of a patient education program are needed to reduce the difference in preferences between patients and experts. In addition, differences in preferences among health care professional groups should be addressed for harmonious treatment.

This study has several limitations. We selected PFS instead of OS as an efficacy attribute, because the OS is not sufficient to represent the pure efficacy by confounding for ethical reasons in clinical trials. PFS is expressed in a shorter period of time than OS, and therefore patients may feel that the efficacy of a drug is too small to be recognized as being important; even a small improvement became an important target for drug development, because it is related to the end of life of patients. On the other hand, doctors and pharmacists understood the meaning of PFS, and consequently their perceived relative importance of PFS was large in this study.

We did not confine the cancer types, and as such patients with any cancer type could answer the questionnaire. This article focuses on the attributes of targeted agents used in treating mRCC, whose incidence rate is very low, and therefore we anticipated that it would be impossible to enroll an adequate number of cases from this type of cancer patients only to derive meaningful results. Moreover, the targeted agents evaluated here are also used for treating other cancer types, and as a result some patients participating in our survey might have experience and might be familiar with the targeted agents. The adverse events and administration used in this article may be commonly presented regardless of the type of cancer, but the possibility cannot be ruled out that the efficacy attributes, which are observed for a relatively short period of time in mRCC, may have influenced the responses of patients with other types of cancer. Therefore, the DCE results might be influenced by this heterogeneity of patients with different cancer types.

In addition, the number of medical oncologists included in the analysis was relatively small. Nevertheless, coefficients of attributes for doctors were statistically significant and hence we could compare the preference of each group. Even though doctors are the most appropriate experts in deciding treatment strategy, other clinical experts such as nurses and pharmacists also play a role in the treat-

Table 6 – Marginal rate of substitution.

Marginal rate of substitution	Meaning	Patient group	Doctors	Nurses		Pharmacists
				Oncology	General	
$-\beta_1/\beta_2$	Bone marrow suppression that can be accepted if the PFS increases by 1 mo (%P)	1.3	9.6	2.3	1.8	3.9
$-\beta_1/\beta_3$	Hand-foot skin reaction that can be accepted if the PFS increases by 1 mo (%P)	1.0	11.8	3.2	3.3	4.8
$-\beta_1/\beta_4$	Gastrointestinal perforation that can be accepted if the PFS increases by 1 mo (%P)	0.4	3.8	0.8	1.9	2.6
$-\beta_1/\beta_5$	Bleeding that can be accepted if the PFS increases by 1 mo (%P)	0.7	3.0	1.1	1.1	2.6
$-\beta_1/\beta_6$	Administration that can be accepted if the PFS increases by 1 mo (oral = 0, injection = 1)	0.2	0.5	0.2	0.2	0.5

ment of patients, including patient care, providing instructions for taking medicine, and management of adverse events. Hence, their preference may influence the patients' attitude, and it is thus meaningful to derive the preferences of various health care professional groups and compare the gaps among them. In this regard, it will be an interesting further research agenda to investigate the influential effect health care professionals and patients' family members have on the patient's drug decision.

Finally, because we conducted the survey on preferences with Korean respondents, these results can be interpreted meaningfully only inside Korea, although they can be applied later to other countries with further similar studies in different settings.

In conclusion, preferences for targeted agents used in mRCC and attributes affecting the preferences differ significantly by group with respect to efficacy, adverse events, and administration methods. The differences in the acceptable levels of adverse events are quite different as well. Doctors prefer effective and orally administered drugs while patients show reluctant attitudes toward adverse events. The preference gap between the health care professionals and the cancer patients needs to be reduced for the successful treatment of mRCC.

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Supplemental Material

Supplemental material accompanying this article can be found in the online version as a hyperlink at http://dx.doi.org/10.1016/j.jval.2012.05.008 at www.valueinhealthjournal.com/issues (select volume, issue, and article).

REFERENCES

[1] Motzer R, Russo P. Systemic therapy for renal cell carcinoma. J Urol 2000;163:408–17.
[2] Coppin C, Porzsolt F, Awa A, et al. Immunotherapy for advanced renal cell cancer. Cochrane Database Syst Rev 2005:CD001425.
[3] Pantuck AJ, Zeng G, Belldegrun AS, Figlin RA. Pathobiology, prognosis, and targeted therapy for renal cell carcinoma: exploiting the hypoxia-induced pathway. Clin Cancer Res 2003;9:4641–52.
[4] Thompson Coon JS, Liu Z, Hoyle M, et al. Sunitinib and bevacizumab for first-line treatment of metastatic renal cell carcinoma: a systematic review and indirect comparison of clinical effectiveness. Br J Cancer 2009;101:238–43.
[5] Thompson Coon J, Hoyle M, Green C, et al. Bevacizumab, sorafenib tosylate, sunitinib and temsirolimus for renal cell carcinoma: a systematic review and economic evaluation. Health Technol Assess 2010;14:1–184, iii–iv.
[6] Mickisch G, Gore M, Escudier B, et al. Costs of managing adverse events in the treatment of first-line metastatic renal cell carcinoma: bevacizumab in combination with interferon-alpha2a compared with sunitinib. Br J Cancer 2010;102:80–6.
[7] Gaston CM, Mitchell G. Information giving and decision-making in patients with advanced cancer: a systematic review. Soc Sci Med 2005;61:2252–64.
[8] Stewart D, Wong F, Cheung A, et al. Information needs and decisional preferences among women with ovarian cancer. Gynecol Oncol 2000; 77:357–61.
[9] Macquart-Moulin G, Viens P, Bouscary M, et al. Discordance between physicians' estimations and breast cancer patients' self-assessment of side-effects of chemotherapy: an issue for quality of care. Br J Cancer 1997;76:1640.
[10] Chrischilles EA, Link BK, Scott SD, et al. Factors associated with early termination of CHOP therapy and the impact on survival among patients with chemosensitive intermediate-grade non-Hodgkin's lymphoma. Cancer Control 2003;10:396–403.
[11] Mendonca PJ, Brehm SS. Effects of choice on behavioral treatment of overweight children. J Soc Clin Psychol 1983;1:343–58.
[12] Lerman CE, Brody DS, Caputo GC, et al. Patients' perceived involvement in care scale. J Gen Intern Med 1990;5:29–33.
[13] Brody DS, Miller SM, Lerman CE, et al. Patient perception of involvement in medical care. J Gen Intern Med 1989;4:506–11.
[14] Swinburn P, Lloyd A, Ali S, et al. Preferences for antimuscarinic therapy for overactive bladder. BJU Int 2011;108:868–73.
[15] Mühlbacher A, Nübling M. Analysis of physicians' perspectives versus patients' preferences: direct assessment and discrete choice experiments in the therapy of multiple myeloma. Eur J Health Econ 2010:111.
[16] Shafey M, Lupichuk SM, Do T, et al. Preferences of patients and physicians concerning treatment options for relapsed follicular lymphoma: a discrete choice experiment. Bone Marrow Transplant 2011;46:962–9.
[17] Bunge EM, de Bekker-Grob EW, van Biezen FC, et al. Patients' preferences for scoliosis brace treatment: a discrete choice experiment. Spine (Phila Pa 1976) 2010;35:57–63.
[18] de Bekker-Grob EW, Essink-Bot ML, Meerding WJ, et al. Patients' preferences for osteoporosis drug treatment: a discrete choice experiment. Osteoporosis Int 2008;19:1029–37.
[19] de Bekker-Grob EW, Essink-Bot ML, Meerding WJ, et al. Preferences of GPs and patients for preventive osteoporosis drug treatment: a discrete-choice experiment. Pharmacoeconomics 2009;27:211–9.
[20] Ryan M, Farrar S. Using conjoint analysis to elicit preferences for health care. BMJ 2000;320:1530–3.
[21] Gidman W, Elliott R, Payne K, et al. A comparison of parents and pediatric anesthesiologists' preferences for attributes of child daycase surgery: a discrete choice experiment. Paediatr Anaesth 2007;17:1043–52.
[22] Ryan M, Gerard K, Amaya-Amaya M, eds. Using Discrete Choice Experiments to Value Health and Health Care. Dordrecht, The Netherlands: Springer; 2008.
[23] Motzer RJ, Hutson TE, Tomczak P, et al. Overall survival and updated results for sunitinib compared with interferon alfa in patients with metastatic renal cell carcinoma. J Clin Oncol 2009;27:3584–90.
[24] Motzer RJ, Hutson TE, Tomczak P, et al. Sunitinib versus interferon alfa in metastatic renal-cell carcinoma. N Engl J Med 2007;356:115–24.
[25] Escudier B, Bellmunt J, Negrier S, et al. Phase III trial of bevacizumab plus interferon alfa-2a in patients with metastatic renal cell carcinoma (AVOREN): final analysis of overall survival. J Clin Oncol 2010;28:2144–50.
[26] Escudier B, Pluzanska A, Koralewski P, et al. Bevacizumab plus interferon alfa-2a for treatment of metastatic renal cell carcinoma: a randomised, double-blind phase III trial. Lancet 2007;370:2103–11.
[27] Montgomery A, Fahey T. How do patients' treatment preferences compare with those of clinicians? Qual Health Care 2001;10:i39.
[28] Smith MC, Wertheimer AI, eds. Social and Behavioral Aspects of Pharmaceutical Care. Binghamton, NY: The Haworth Press; 1996.
[29] Hershman D, Calhoun E, Zapert K, et al. Patients' perceptions of physician patient discussions and adverse events with cancer therapy. Arch Drug Info 2008;1:70–8.
[30] Mackillop W, Stewart W, Ginsburg A, Stewart S. Cancer patients' perceptions of their disease and its treatment. Br J Cancer 1988;58:355.
[31] Rothenbacher D, Lutz M, Porzsolt F. Treatment decisions in palliative cancer care: patients' preferences for involvement and doctors' knowledge about it. Eur J Cancer 1997;33:1184–9.
[32] Fallowfield L, Atkins L, Catt S, et al. Patients' preference for administration of endocrine treatments by injection or tablets: results from a study of women with breast cancer. Ann Oncol 2006;17:205.
[33] Young A, Topham C, Moore J, et al. A patient preference study comparing raltitrexed (Tomudex') and bolus or infusional 5-fluorouracil regimens in advanced colorectal cancer: influence of side-effects and administration attributes. Eur J Cancer Care 1999;8:154–61.
[34] Gregorian RS Jr, Gasik A, Kwong WJ, et al. Importance of side effects in opioid treatment: a trade-off analysis with patients and physicians. J Pain 2010;11:1095–108.
[35] Bremnes R, Andersen K, Wist E. Cancer patients, doctors and nurses vary in their willingness to undertake cancer chemotherapy. Eur J Cancer 1995;31:1955–9.
[36] Sekimoto M, Asai A, Ohnishi M, et al. Patients' preferences for involvement in treatment decision making in Japan. BMC Fam Pract 2004;5:1.
[37] Suarez-Almazor ME. Patient-physician communication. Curr Opin Rheumatol 2004;16:91.
[38] Spitzer WO, Dobson AJ, Hall J, et al. Measuring the quality of life of cancer patients: a concise QL-Index for use by physicians. J Chron Dis 1981;34:585–97.
[39] Bruera E, Sweeney C, Calder K, et al. Patient preferences versus physician perceptions of treatment decisions in cancer care. J Clin Oncol 2001;19:2883.
[40] Bruera E. Process and content of decision making by advanced cancer patients. J Clin Oncol 2006;24:1029.
[41] Hack TF, Degner LF, Parker PA. The communication goals and needs of cancer patients: a review. Psycho Oncol 2005;14:831–45.
[42] Bonaccorso S, Sturchio JL. Perspectives from the pharmaceutical industry. BMJ 2003;327:863–4.
[43] Baile WF, Aaron J. Patient-physician communication in oncology: past, present, and future. Curr Opin Oncol 2005;17:331.
[44] Bredart A, Bouleuc C, Dolbeault S. Doctor-patient communication and satisfaction with care in oncology. Curr Opin Oncol 2005;17:351.
[45] Repetto L, Piselli P, Raffaele M, Locatelli C. Communicating cancer diagnosis and prognosis: when the target is the elderly patient—a GIOGer study. Eur J Cancer 2009;45:374–83.